

AMENDMENTS TO THE CLAIMS

Please amend the claims as follows:

24. (Currently Amended) A glow plasma discharge apparatus for generating and maintaining a glow plasma ~~discharge;~~ discharge comprising:

1 a pair of electrodes ~~positioned at facing relation having a space therebetween;~~

2 a perforated dielectric placed over one of the electrodes and partially occupying the space; and

3 a time varying electric field generated between the electrodes.

25. (Previously Added) The apparatus of claim 24 wherein the time varying electric field is generated by AC current.

26. (Previously Added) The apparatus of claim 24 wherein the time varying electric field is generated by pulsed DC current.

27. (Previously Added) The apparatus of claim 24 wherein the perforated dielectric comprises a plurality of apertures, each aperture having a diameter ranging from 5 to 200 μ m.

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28. (Previously Added) The apparatus of claim 27 wherein the dielectric is between 100 μ m and 2mm in thickness.

29. (Cancelled) The apparatus of claim 28 wherein the dielectric comprises silicon nitride.

30. (Cancelled) The apparatus of claim 28 wherein the dielectric comprises silicon carbide.

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31. (Previously Added) The apparatus of claim 28 wherein a second dielectric is placed over the other of the electrodes.

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32. (Currently Amended) The apparatus of claim 28 wherein the dielectric is a high temperature dielectric able to withstand high temperatures.

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33. (Currently Amended) A cathode An apparatus for generating and maintaining a glow plasma discharge at atmospheric pressure ~~comprising;~~ comprising:

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an electrode;

a time varying electric field applied to the electrodes; electrode;

perforated dielectric means placed over the electrode; and

means for retaining the perf rated dielectric on the electrodes. electrode.

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34. (Previously Added) The apparatus of claim 33 wherein the time varying electric field is generated by AC current.

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35. (Previously Added) The apparatus of claim 33 wherein the time varying electric field is generated by pulsed DC current.

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36. (Previously Added) The apparatus of claim 33 wherein a perforated dielectric means comprises a plurality of apertures, each aperture having a diameter ranging from 5 to 200 μ m.

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37. (Previously Added) The apparatus of claim 36 wherein the perforated dielectric means is between 100 μ m and 2mm in thickness.

38. (Cancelled) The apparatus of claim 37 wherein the perforated dielectric means comprises silicon nitride.

39. (Cancelled) The apparatus of claim 37 wherein the perforated dielectric means comprises silicon carbide.

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40. (Currently Amended) The apparatus of claim 38 wherein further comprising a second perforated dielectric means is placed over the other of the electrodes, a second electrode.

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41. (Currently Amended) The apparatus of claim 38 wherein the perforated dielectric means is a high temperature dielectric able to withstand high temperatures.

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42. (Currently Amended) A Method method of generating and maintaining a glow plasma discharge comprising the steps of:

positioning opposing electrodes in a facing relation with a space therebetween;

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53. providing within the space a perforated dielectric having a plurality of apertures of micron dimension; and

generating a time varying electric field between the electrodes.

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43. (Previously Added) The method of claim 42 wherein the time varying electric field is generated by AC current.

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44. (Previously Added) The method of claim 42 wherein the time varying electric field is generated by pulsed DC current.

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45. (Previously Added) The method of claim 42 further comprising the step of providing a second perforated dielectric having a plurality of apertures of micron dimension within the space.

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46. (Previously Added) The method of claim 42 wherein the step of positioning the perforated dielectric with the space further comprises placing the perforated dielectric on an electrode and retaining the dielectric thereon.

20 47. (Previously Added) The method of claim 46 wherein the step ¹⁹ of retaining the dielectric on one of the electrodes further include the step of placing a retaining collar over the dielectric.

21 48. (Previously Added) The method of claim 42 wherein the step of positioning the perforated dielectric within the space comprises the step of depositing a dielectric on one of the electrodes.

22 49. (Previously Added) The method of claim 46 wherein the step of depositing a dielectric on one of the electrodes comprises vapor deposition.

23 50. (Currently Amended) A method of stabilizing glow-to-arc transition for a discharge plasma comprising the steps of:

~~positioning electrodes in facing relation; providing a pair of electrodes;~~

positioning a dielectric having a plurality of current limiting micro-channel apertures therethrough for limiting current ~~density~~ from increasing above glow-to-arc transition between the electrodes; and

applying a time varying electric field between the electrodes.

24 51. (Previously Added) The method of claim 50 wherein the time varying electric field is generated by AC current.

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52. (Previously Added) The method of claim ²³ 50 wherein the time varying electric field is generated by pulsed DC current.

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53. (Previously Added) The method of claim ²³ 50 further comprising the step of covering the other of the electrodes with a perforated dielectric having a plurality of current limiting micro-channel apertures so that both electrodes are covered.

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54. (Previously Added) The method of claim ²³ 50 wherein the step of covering one of the electrodes comprises placing a dielectric material thereon and retaining the dielectric material thereon.

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55. (Previously Added) The method of claim ²¹ 54 wherein the state of retaining the dielectric material on one of the electrodes further includes the step of securing a retaining collar having an upper surface with a cylindrical aperture extending therethrough, and sidewalls depending therefrom, over the dielectric.

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56. (Previously Added) The method of claim ²³ 50 wherein the step of covering one of the electrodes comprises the step of depositing a dielectric on one of the electrodes.

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57. (Previously Added) The method of claim ²⁹ 56 wherein the step of depositing a dielectric on one of the electrodes comprises vapor deposition.

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^{58.} (Currently Amended) A method of generating and maintaining a glow plasma discharge at atmospheric pressure comprising the steps f:

positioning opposing electrodes in a facing relation with a space therebetween;

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providing within the space a perforated dielectric having a plurality of apertures of micron dimension; and

generating an electric field between electrodes.

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^{59.} (Previously Added) The method of claim ³¹⁵⁸ further comprising the step of providing a second perforated dielectric having a plurality of apertures of micron dimension within the space.

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^{60.} (Previously Added) The method of claim ³¹⁵⁸ wherein the step of positioning the perforated dielectric within the space comprises the step of depositing on one of the electrodes.

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^{61.} (Previously Added) The method of claim ³³⁶⁰ wherein the step of depositing a dielectric on one of the electrodes comprises vapor deposition.

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^{62.} (New) The method of claim ²⁴³⁴, wherein the electrodes are positioned in a facing relation.
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^{63.} (New) The method of claim ⁴²³⁵, wherein the electrodes are positioned in a facing relation.

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(New) The method of claim 50, wherein the electrodes are positioned in a facing relation.

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(New) The method of claim 58, wherein the electrodes are positioned in a facing relation.

Please cancel claims 29, 30, 38, and 39.